



Southern California Edison

Stephanie Hamilton

Manager

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**Small Business
Assistance Conference**

Small Business Assistance Conference



Update on the Energy Scenario

Southern California Edison

Stephanie Hamilton, Manager

Selected SCE Programs

Stephanie L. Hamilton, SCE

AQMD's Small Business
Assistance Program

Brea, CA

October 21, 2002



Energy Efficiency Programs

- Express Efficiency for:
 - Air Conditioning
 - Refrigeration
 - Lighting
 - Irrigation, Agriculture & Motors
- Standard Performance Contract allows program customization for customers



Topics

- Brief Summaries of SCE Customer Programs in
 - Energy Efficiency
 - Load Reduction
 - Self-Generation Incentive
- Overview of SCE's microturbine generator [MTG] testing program



Energy Efficiency Programs Contact Options

- Website – www.sce.com
 - (select "Rebates and Offers")
- Reservations 800.736.4777
- Technical Support Line
 - 800.736.4777 or 626.302.1724
- Operations Center 626.302.3818
- E-mail – Bizrebate@sce.com
- Jacqueline Jones, Project Manager
 - 626.302.8798
 - or e-mail Jacqueline.Jones@sce.com



Express Energy Efficiency Programs

- Rebates for Small and Medium Sized Business Customers
- Small to Medium Business Customers Maximum monthly demand of 500kW
- Direct customer rebates for prescribed energy efficient equipment retrofits



Load Reduction Programs


- Help qualifying customers reduce their energy usage during peak times, while lowering their electricity costs.
- Qualifying customers who can reduce power when statewide energy supplies are low may earn financial incentives and/or other benefits by participating in these programs.
- Doing so, can make a difference in the state's energy and economic well-being.





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Business Customer Load Reduction Programs*

- The Demand Bidding Program (DBP)
 - The Base Air Conditioner Cycling Program (GS-APS)
 - Enhanced Air Conditioner Cycling Program (GS-APS-E)
 - Base Interruptible Program (I-6-BIP)
 - The Interruptible Service Program
 - The Agricultural and Pumping Interruptible Service Program
 - The Scheduled Load Reduction Program (SLRP)
 - Optional Binding Mandatory Curtailment Program (OBMC)
 - SCE's Peak Load Reduction Program
 - The SCE EnergySmart Thermostat Program
- * some have required a minimum customer load level
- 
- EDISON



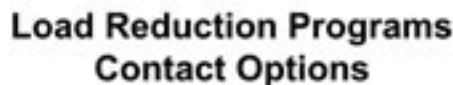
- Provides financial incentives for new self-generation equipment – program continues through 12/31/04
- Implemented to reduce electricity demand in California
- State-wide program Administrators are:
 - PG&E
 - SCE
 - SoCalGas,
 - SDG&E, San Diego Regional Energy Office

[illegible]

Annual incentive budgets authorized by the CPUC are as follows: One-third of the incentive budget for each administrator is initially allocated to each of the self-generation categories (Levels 1, 2 and 3).

Pacific Gas and Electric Company	\$48,000,000
Southern California Edison Company	\$26,000,000
Southern California Gas Company	\$13,600,000
San Diego Regional Energy Office	\$12,400,000

Year to Date SCE Incentive Paid
Projects: 5 Capacity: 1.5 MW Incentives paid: \$1.2M



- Website – www.sce.com
– (select "Load Reduction Incentives")
- Information at 800.423.9896
- Mark Wallenrod, Manager
– 626.302.8331
– or e-mail Mark.Wallenrod@sce.com



Incentive Category	Incentive (\$/kWt)	Max. % of Project Cost	Min. System Size	Max. System Size for Incentive Payment ⁽¹⁾	Eligible Technologies
Level 1	\$4.50/W	50%	30 kW	1 MW	<ul style="list-style-type: none"> • Photovoltaics⁽²⁾ • Wind turbines⁽²⁾ • Fuel cells (renewable fuel)
Level 2 ⁽³⁾	\$2.50/W	40%	None	1 MW	<ul style="list-style-type: none"> • Fuel cells (non-renewable fuel)
Level 3 - (R)	\$1.50/W	40%	None	1 MW	<ul style="list-style-type: none"> • Microturbines (renewable fuel) • IC engines and small gas turbines (renewable fuel)
Level 3 - (N)	\$1.00/W	30%	None	1 MW	<ul style="list-style-type: none"> • Microturbines • Internal combustion engines • Small gas turbines

[illegible]

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Southern California Edison

Stephanie Hamilton, Manager

SGIP Contact Information

- **Program Information**
 - Program overview, handbook, applications, etc.
 - Website: www.sce.com/sgip
- **Program Support**
 - Howard Green
 - 626.302.8436
 - greenh@sce.com
- **Program Management**
 - Robert Thomas
 - 626.302.1746
 - Robert.Thomas@sce.com



Capstone 28 kW



- ♦ Model 330 rated output: 30 kW at ISO
- ♦ 480 VAC, 3-phase, 60 Hz
- ♦ Recuperated single stage radial flow compressor and turbine on a single shaft, integrated with generator
- ♦ Equipped with a low NOx combustor
- ♦ Not equipped with a waste heat recovery boiler
- ♦ Fourth generation unit
- ♦ One unit only capable of grid connect
- ♦ One unit capable of stand alone and grid connect operation



SCE Microturbine Generator (MTG) Testing Program

Goal & Objectives:

Goal: determine the performance, reliability, operability, availability, maintainability, and overall characteristics of commercially available MTGs.

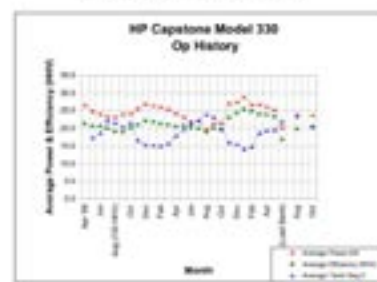
Objectives: compare MTGs' actual performance to performance specifications & industry/other standards, such as emissions.

Accomplishments:

- \$3.0+ million program in progress since 1996
- 13 different MTGs tested or in test
- Two to four more MTGs expected for testing
- Over 60,000 hours of testing
- Implemented "live" browser enabling technology



Capstone 28 kW



SCE MTG Test Bed

- 4 test bays
- 400 amp 480 volt service
- 100 psig natural gas with ability to blend for lower Btu testing
- Cogen heat dissipation ability
- Instrumentation for gas and electricity
- Electronic data acquisition
- Standardized testing procedures
- Veteran on-site two-person testing crew
- Ability to do specialized/custom testing



Testing Schedule & Status: 08/29/02

Capstone "B" 30 kW	Jan-97	858 Completed
Capstone "B" 30 kW	Jan-97	867 Completed
Capstone 10 Pack	Apr-97	26 Completed
Capstone "C" 30 kW	May-97	3,794 Completed
Capstone "C" 30 kW	Jul-97	2,879 Completed
Bowman 35 kW	Feb-99	100 Completed
Bowman 60 kW	Jun-99	60 Completed
Capstone HP 30 kW	Apr-99	21,884 Operating
Parsons 75 kW	Jun-00	5,806 Completed
Capstone LP 30 kW	Aug-00	15,915 Operating
Bowman 80 kW	Jun-01	5,899 Operating
Elliott 80 kW	Jan-02	1,588 Operating
Total		58,176





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Desirable Attributes vs. Test Parameters

• ATTRIBUTES

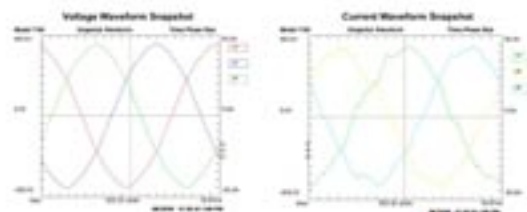
- Heat rate 12,000 to 16,000 BTU/kWh
- Good Part Load Performance
- Emissions < 9 ppm
- Power Quality < IEEE 519
- Noise < 70 dBA
- Endurance = 40,000 hours
- Installation = Easy & Cheap

• TEST PARAMETERS

- Overall unit efficiency
- Net Power Output
- Emissions
- Power Quality
- Noise
- Endurance
- Ease of Installation
- Operability
- Maintainability



Capstone Voltage & Current Waveforms



Capstone 28 kW Results

- ✓ Several overspeed trips were resulting from flame control algorithm; Capstone remotely downloaded revised control system software; no overspeed trips since software revision
- ✓ Reliable operation following resolution of overspeed
- ✓ Comparing manufacturer's efficiency and heat rate claim with test results converted to a common basis, resulted testing results consistent with claims as shown below @ 70°F, about sea level, and LHV:

	(tested)	(claimed)
Efficiency	23.7% ± 0.45%	24.5% ± 0.5%
Heat rate	14,415 BTU/kWh	13,931 BTU/kWh

Honeywell 75 kW



- ❖ Parallon™ 75 kW at ISO
- ❖ 275 AC with Honeywell transformer option added to boost to 480 VAC, 3-phase, 60 Hz at site
- ❖ Recuperated single stage radial flow compressor and turbine on a single shaft, integrated with generator
- ❖ Not equipped with a heat recovery boiler – option is available
- ❖ Grid parallel or stand-alone operation
- ❖ Internal gas compressor



Capstone 28 kW Results

- Total Harmonic Distortion (THD) requirements specified by IEEE 519 were met:
 - Voltage THD: 1.6% measured average < 5% IEEE 519
 - Current THD: 5.67% measured average < 8% IEEE 519
- Noise measurement taken at 2m due to site conditions, e.g. obstructions and site compressor noise. Noise measured 70 dBA @ 2m, consistent with manufacturer's claim, 65 dBA, 10m.
- Emissions test results met SCAQMD requirements:

Manufacturer Claim	SCAQMD Standard (Rule 1103)	Test Result (dBA)
		< 9ppm



Bowman 80 kW CHP



- ❖ Bowman 80 kW at ISO
- ❖ 480 VAC, 3-phase, 60 Hz
- ❖ Recuperated single stage radial flow compressor and turbine on a single shaft, integrated with generator
- ❖ Integrated heat recovery boiler
- ❖ In grid parallel operation



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Elliott 80 kW



- ♦ Elliott 80 kW at ISO
- ♦ 480 VAC, 3-phase, 60 Hz
- ♦ Recuperated single stage radial flow compressor and turbine on a single shaft, integrated with generator
- ♦ Not equipped with a heat recovery boiler – option is available
- ♦ Grid parallel or stand-alone operation



Summary of Testing Results (cont.)

- 2000
 - Began testing Low Pressure [LP] Capstone
 - Began testing Honeywell
- 2001
 - Initial results for Capstones - both LP and upgraded HP
 - Honeywell results
 - Began testing Bowman
 - Elliott returned to manufacturer for upgrade
 - Elliott returned to test site and testing resumed
- 2002
 - Begin testing of Ingersoll-Rand
 - Seek other MTGS, such as Capstone 60 kW, Turbec 100 kW CHP
 - Finalize results for Capstones and Bowman



Future testing -- Ingersoll-Rand 70 kW



- ♦ Ingersoll-Rand 70 kW at ISO
- ♦ 480 VAC, 3-phase, 60 Hz
- ♦ A dual shaft recuperated MTG;
 - ♦ A radial flow compressor and gasifier turbine on one shaft,
 - ♦ A radial flow power turbine on the other shaft.
- ♦ The power turbine drives the reduction gear and induction generator for grid parallel-only operation.
- ♦ Heat recovery boiler option available
- ♦ Internal gas compressor



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626.302.8937



Summary of Testing Results

- 1997 Testing of Capstone units (Beta, Charlie – pre-commercial)
 - Did not meet manufacturer's expectations
 - First & second generation units
 - Began testing "next generation" in 1999
- 1998 No MTGs commercially available to purchase and test
- 1999 Testing of Bowman units (pre-commercial)
 - Did not meet manufacturer's expectations
 - First generation units
 - Began testing "next generation" in 2001
- 1999 Testing of High Pressure [HP] Capstone unit
 - Met manufacturer's claims
 - Fourth generation unit
 - Began testing "next generation" in 2000



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Los Angeles Department of Water and Power

Don Cunningham

Director – Energy Efficiency Programs
Los Angeles Department of Water and Power
Energy Efficiency for a Green LA
111 North Hope Street
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Cleaning the air that we breathe...

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Update on the Energy Scenario

Los Angeles Department of Water and Power

Don Cunningham, Director of Efficiency Solutions

Small Business Assistance Conference Sponsored by the AQMD October 21, 2002

LADWP GreenLA Programs
Don Cunningham
Director - Energy Efficiency Programs



1-800-GreenLA

www.GreenLA.com

Accomplishments

- More than 130 MW peak demand reduction
- 75,000 Green power customers purchasing 84 million kWh of renewable energy per year
- Over 4,000 Trees planted
- Over 1.2 MW of PV installed
- 250 Electric Vehicles in our fleet, 600 charging stations in Southern California and 134 new electric postal vehicles in Los Angeles
- 15,000 LED pedestrian signals deployed
- Electric leaf blower in development



1-800-GreenLA

www.GreenLA.com

LADWP

- 100 years and still going strong
- 1.4 million electric customers – 3.5 million population
- 464 square miles service territory
- 6,500 employees
- Owned by the people of Los Angeles
- Among the lowest power rates in California
- Committed to reliable, low cost, environmentally responsible electricity



1-800-GreenLA

www.GreenLA.com

Low Income Programs

- Low Income rate Reduction
 - Reduces the cost of electricity, water and sewer treatment by up to 15%
- NBRS - Neighborhood Bill Reduction Service
- LIREP - Low Income Super Efficient Refrigerator Exchange Program
- Senior Citizen Lifeline rate
- Fans for Elders Program



1-800-GreenLA

www.GreenLA.com

LADWP Public Benefits Budget

- Approximately:
 - 60 million dollars per year
 - 50% on low income programs
 - 30% on energy efficiency programs
 - 15% on renewable energy programs
 - 5% research and development programs



1-800-GreenLA

www.GreenLA.com

GreenLA

- The GreenLA Concept
 - Energy Efficiency for a GreenLA
 - Solar Energy for a GreenLA
 - Green Power for a GreenLA
 - Electric Vehicles for a GreenLA
 - Trees for a GreenLA



1-800-GreenLA

www.GreenLA.com



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Update on the Energy Scenario

Los Angeles Department of Water and Power

Don Cunningham, Director of Efficiency Solutions

GreenLA Program Benefits

- Cleaner air
- Energy cost reduction
- Resource diversity
- Improved system reliability
- Economic development
- Environmental image
- Homeland security!



1-800-GreenLA

www.GreenLA.com

Electric Vehicles



- Vehicles
 - EV Service and Repair Center
 - Vehicle Warranty Service Provider
- EV Training for Technicians and Fleet Managers
 - San Pedro Post Office All-electric fleet
- Infrastructure
 - Public Charging Stations
 - Turn-Key Assistance for EV Owners
- Education
 - Public Awareness Program



1-800-GreenLA

www.GreenLA.com

Green Power



- Green power product
 - Residential
 - 20% from new renewable sources
 - Commercial
 - 500 to 1,000 kwh/month or custom contracts
- Green power pricing
 - Residential
 - 30% premium for green power = 6% higher utility bill = \$3 per month based on \$50 bill
 - Commercial
 - 30% premium for green power = \$30 for 1,000 kwh/month or custom contracts



1-800-GreenLA

www.GreenLA.com

Tree Planting



- Trees for a GreenLA
- Launched January, 2002
- 200,000 shade trees to be planted in two years
 - Residential tree planting for energy efficiency
 - Residents attend workshops to qualify for up to seven trees
 - Tree planting near public buildings, in public spaces, under power lines, schools, and on new construction properties



1-800-GreenLA

www.GreenLA.com

Solar Program



- Five-year program
- Funding: \$8-16M per year
- Incentives for LADWP customers – up to \$6 per watt
- Solar installations of city-owned buildings
- Local manufacturing incentives



1-800-GreenLA

www.GreenLA.com

Energy Efficiency



- LADWP offers an award winning selection of Energy Efficiency Programs for residential, commercial and industrial customers
- Our programs have resulted in peak load savings of over 130 Megawatts
- Energy Star® partner and Flex Your Power® participant



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www.GreenLA.com

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Los Angeles Department of Water and Power

Don Cunningham, Director of Efficiency Solutions

Residential Efficiency Programs

- Home energy audits
 - via web
 - CDROM
 - mail-in
- Consumer Rebate Program for ENERGY STAR® appliances, including:
 - Refrigerators
 - Dishwashers
 - Thermostats
 - Washing Machines
 - Ceiling Fans
 - Air Conditioners
- Refrigerator recycle program
- Low income super efficient refrigerator exchange



1-800-GreenLA

www.GreenLA.com

Water Services



- Technical Assistance Program
- Cooling Tower Technology
- Plumbing Fixture Incentives
- Commercial Irrigation Controls



1-800-GreenLA

www.GreenLA.com

Commercial Energy Efficiency Rebate Programs

- LADWP offers a variety of incentive based energy efficiency programs for commercial customers including :
 - Chillers
 - Lighting
 - HVAC
 - Thermal energy storage
 - Window film
 - Innovative Technology



1-800-GreenLA

www.GreenLA.com

Los Angeles Department of Water and Power



- Toll-free number: 800 GreenLA
- Website: GreenLA.com



1-800-GreenLA

www.GreenLA.com

Other Commercial Efficiency Programs

- Commercial Audits
 - Web based and on site
- Watch for our new:
 - New construction incentives
 - Small commercial assistance
- Real time metering
- Energy-related Seminars
- Enterprise Zone rates



1-800-GreenLA

www.GreenLA.com



Southern California Gas Company

Chris Goff

Market Consultant

Southern California Gas Company

P.O. Box 513249

ML GT22E3

Los Angeles, CA 90051-1249

Phone: (213) 244-3693

Fax: (213) 244-8222

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Update on the Energy Scenario

Southern California Gas Company

Chris Goff, Marketing Consultant

The Southern California Gas Co.:

AQMD Small Business Assistance Conference

October 21, 2002

Christopher T. Goff
Market Analyst
The Southern California Gas Company
A SoCalGas Energy Utility

The Southern California Gas Co.:

SoCalGas

- Employees: 6,300
- Service Territory: 23,000 sq. miles
- # of Customers: Over 5 Million
- Miles of pipeline: Over 48,000 mi.
- Storage Capacity: 119 Bcf
- Annual Throughput: 1,153 Bcf

The Gas Company - Service Territory



The Gas Company - Customer Services:

- Managing utility costs to keep rates low
- Incentives and Rebates
- Energy efficiency tools to help customers manage energy costs
 - On-site Energy Audits to identify energy conservation opportunities
 - Commercial & Industrial Energy Efficiency Rebates & Incentives
 - Gas Company Service Territory Gas Supply
 - Technology: Appliances
 - Energy Efficiency Studies
- New High Efficiency Gas Technologies
- Gas Supplies
- Pipeline Security



Rebates & Incentives - The PARR Program

Foodservice Equipment Rebate Program

- PARR Program - Purchase, Apply, Receive Rebate
- Offers Rebates for the purchase of high efficiency gas fired food service equipment.
- Rebate levels are dependant on technology and range from:
 - \$3.00 per thousand Btu (Mbtu) of input to
 - \$10.00 per thousand Btu (Mbtu) of input

Note: 1 Mbtu is approximately 1 cubic foot of gas



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Rebates & Incentives - The PARR Program

Equipment funded under the Foodservice Program:

Commercial ovens	Combination ovens	Rotating rack ovens
Deck ovens	Conveyor-Band Broilers	Door-Band Charbroilers
Griddles	Chimney ovens	Rotisseries
Steam kettles	Steaming Pans	Cakelet Pans
High efficiency Freezers	Freezer electronic systems	

Rebates & Incentives - The IEEP Program

Industrial Energy Efficiency Program:
Offers customers cash incentives to replace old equipment with new, high efficiency equipment.

Incentive levels:

Equipment type	Incentive level
Process equipment replacement: Furnaces, Industrial Ovens, Kilns, Industrial Dryers	\$75/ton saved up to 30% of equipment cost
Process Energy Conservation: Process Control, Heat Recovery, Steam/Jacket, Insulation	\$75/ton saved up to 30% of equipment cost
Gas Engine Internal or External	\$40/HP or 20% of installed cost

Rebates & Incentives - Express Efficiency Rebate

Express Efficiency Rebate Program:
Offers customers Rebates for new, high efficiency gas fired equipment.

This includes:

Industrial Air Heaters	Storage Water Heaters
Space Heating Boilers	Hot Water Boilers
Unconventional Water Heaters	Process Heaters
Process Heaters / Process Dryers	Pipe Insulation
Tank Insulation	Commercial Heat Cables

Rebates & Incentives - Self Generation Incentive Program

The Self Generation Incentive Program:
Offers incentives to install Distributed Generation Technologies. These include:

- Micro-turbines
- Photovoltaic (solar power)
- IC engine generators
- Fuel cells
- Wind turbines

Rebates & Incentives - Self Generation Incentive Program

The Self Generation Incentive Program:

Location Category	Discount Offered (\$/kW)	Max % of project cost	Min Size	Max Size	Eligible Technologies
Level 1	\$4500	80%	30 kW	1.5 MW	Photovoltaic, Fuel cells - renewable fuel, Wind turbines, Fuel cells - Natural Gas
Level 2	\$2500	60%	None	1.5 MW	
Level 3a	\$1500	60%	None	1.5 MW	
Level 3b	\$1000	30%	None	1.5 MW	Microturbines, Gas engines and turbines using renewable fuel, Biomethanols, Gas engines and turbines using non-renewable fuel

New Gas Technologies for your business

- Power generation systems (all types)
- Catalytic (infrared):
 - Curing
 - Drying
 - Plastic thermofforming
- Gas Cooling systems
- Gas Refrigeration systems
- Clean Combustion Technologies
- Clean Natural Gas Vehicles


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Southern California Gas Company

Chris Goff, Marketing Consultant



The Gas Company's after meter services

Gas Company Service Technicians are trained to provide customers with:


- Combustion adjustments
- Non-certified Emissions testing
- Pressure tests
- Safety inspections
- Gas Engine Adjustments



The Gas Company's after meter services

Other services available to customers include:

- Technology Specialists that can analyze your process
- Air Quality assistance
 - Equipment permitting handbooks
 - Permit Works - a fee for service to help you permit your gas fired equipment
- Energy Resource Centre - where you can see the latest energy efficient technologies




California Gas Supplies

Our customers have access to supplies throughout western North America. This includes:

- West Texas
- Gulf of Mexico
- Rocky Mountains
- Canadian Gas Supplies
- California Gas Supplies

Customers may use:

- Utility procurement
- Marketer's services or,
- Buy their own Natural Gas.



Pipeline Security

The Gas Company has taken steps to increase the security of the SoCalGas System. Steps taken include:

- Identifying key facilities that keep gas flowing
- Hardened critical facilities
- Increased pipeline patrols
- Added perimeter and intrusion alarms
- Increased use of surveillance cameras at key points
- High reliability is designed into our system. We can reroute gas to serve customers in the event of a problem.



For more information:

The Southern California Gas Company website:
<http://www.socalgas.com>

SoCalGas Customer Program Information:
<http://www.socalgas.com/customerprogram>


SoCalGas Risk and Insurance Program:
<http://www.socalgas.com/riskandinsurance>

SoCalGas Natural Gas Technology:
<http://www.socalgas.com/technology>

Natural Gas Equipment and Services:
<http://www.socalgas.com/equipmentandservices>

SoCalGas Business:
<http://www.socalgas.com/business>

Natural Gas Supply Information:
<http://www.socalgas.com/supply>



Conclusion:

Questions?



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Update on the Energy Scenario

Southern California Gas Company

Chris Goff, Marketing Consultant



Sempra Energy[®] utilities

For more information:

The Southern California Gas Company website:

<http://www.socalgas.com/>

Self Generation Incentive Program information:

<http://www.socalgas.com/business/selfgen/>

SoCalGas Rebate and Incentive Programs:

http://www.socalgas.com/business/cash_for_you/

Innovative Natural Gas Technologies:

http://www.socalgas.com/business/useful_innovations/ts_home.shtml

Natural Gas Equipment and Services:

<http://dmz.socalgas.com/pib/index.asp>

Air Quality Services:

http://www.socalgas.com/business/resource_center/aq_programs.shtml

Natural Gas Marketer information:

http://www.socalgas.com/business/customer_choice/customer_choice_home.shtml



California Energy Commission

Terrence O'Brien

Deputy Director

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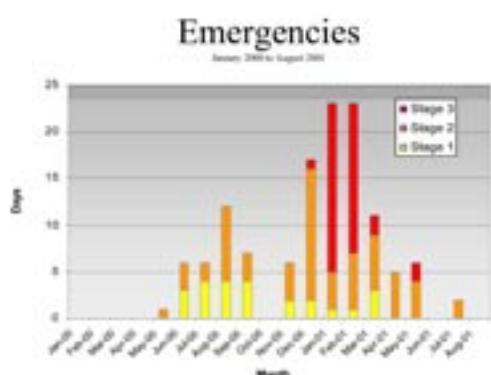
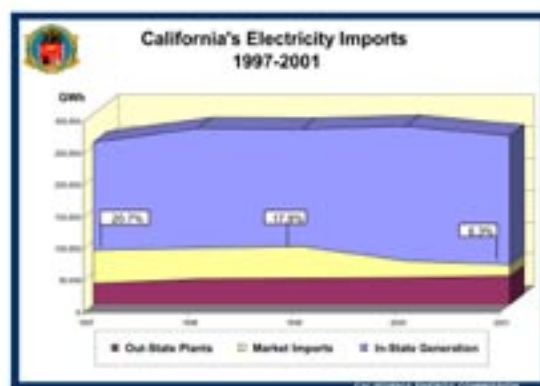
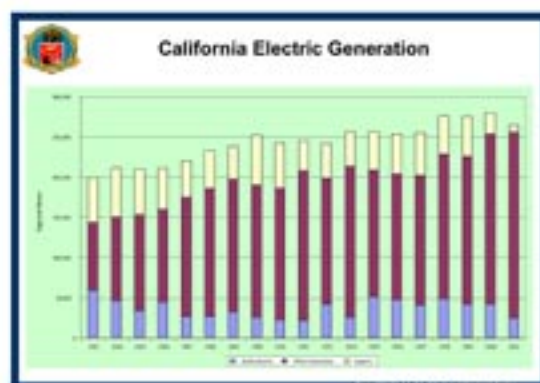
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Update on the Energy Scenario

California Energy Commission

Terrence O'Brien, Deputy Director





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Update on the Energy Scenario

California Energy Commission

Terrence O'Brien, Deputy Director



Permitting Options

Permit	Authority	CEQA	Requirement
12-Month AFC	PRC 25500+	"EIR"	none
6-Month AFC	AB 970	"ND"	No Impacts
4-Month AFC	AB 970 SB 28x	"ND"	No Impacts On-line 2002
Emergency Permit	PRC 25705 Declaration	NA	On-line 2001



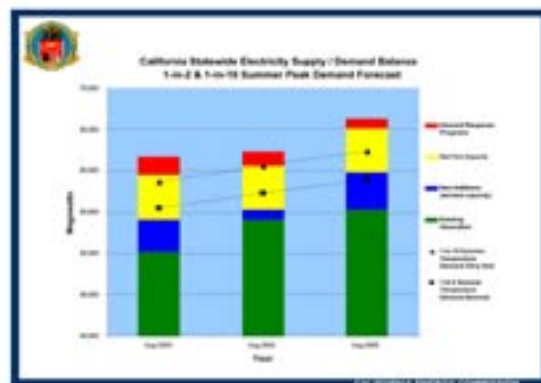
Components of Success

Site	Developer	Agencies
Have proper zoning	Know project	Know process
Have "local" offsets	Clear internal comm.	Be flexible
Use reclaimed water	Open communication	Open communication
Have site control	Be flexible	Solve problems
Minimize linears	Accept responsibility	Be consistent
Avoid T&E species	Know impacts	Listen to public
Avoid TL congestion	Know community	Be creative

Options

Option	Air	Water	Land	Noise	Bio. Res.
New Comb. Cycle	Yellow	Yellow	Yellow	Yellow	Yellow
New Simple Cycle	Yellow	Yellow	Yellow	Yellow	Yellow
New Wind	Green	Green	Yellow	Yellow	Yellow
Restart Steam Turbine	Yellow	Yellow	Yellow	Yellow	Yellow
Restart Biomass	Yellow	Yellow	Yellow	Yellow	Green
Natural Gas Barge	Yellow	Yellow	Red	Red	Yellow
Diesel Locomotive	Red	Green	Red	Red	Green
Back Up Generator	Red	Green	Yellow	Red	Green

Permitting Difficulty: Green = Easy, Yellow = Moderate, Red = Difficult



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Update on the Energy Scenario

California Energy Commission

Terrence O'Brien, Deputy Director

Projects Under Review in the Greater Los Angeles Basin

- Vernon 134 MWs 2004
- El Segundo Repower 630 MWs 2005
- Inland Empire 670 MWs 2005
- Magnolia 328 MWs 2005



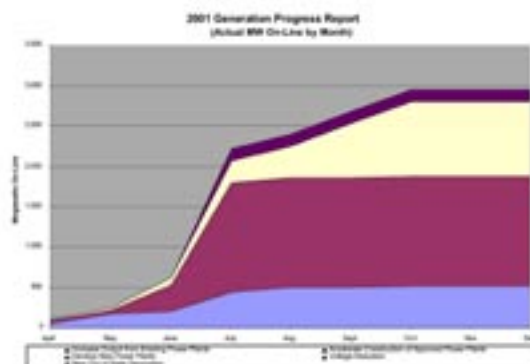
Energy Commission-Approved Power Plant Projects

	MW On-line by July 31				
	2001	2002	2003	2004	2005
Power Plants 200 MW and larger					
Operating	1,415	2,172			
Under Construction			3,163	750	1,110
Power Plants less than 200 MW					
Operating	180	594			
Under Construction			480		
Total New Generation	9,864	1,595	2,766	3,643	750
					1,110

Uncertainties

- Market design changes
- Utility and financial condition
- Industry financial condition
- Plant construction slippage
- Existing plant maintenance
- Role of utility owned generation
- Role of public power
- Provisions for long-term contracts
- ISO structure
- Federal - State relationships

?



Concluding Thoughts

- The State's role in energy is critical:
 - Long-term planning and information
 - Regulatory review
 - Policy guidance
 - Monitoring and oversight
- Must be performed in a manner that is:
 - Reflective of the broader energy system
 - Cooperative with other government entities

Implications

- Positive:
 - The "bureaucracy" can respond
 - Good sites / projects are available
 - The public accepts a real emergency
- Negative:
 - "Planning" was missing
 - Easy to abuse public trust
 - Can't rush problem projects



California Energy Commission
Terrence O'Brien, Deputy Director

- Agencies
 - 1 Seek solutions
 - 2 Be consistent
 - 3 Meet commitments
 - 4 Coordinate with each other
- Applicants
 - 1 Meet with agencies early and listen
 - 2 File a complete application
 - 3 Minimize project changes
 - 4 Have site control



Cleaning the air that we breathe...



Parker Boilers

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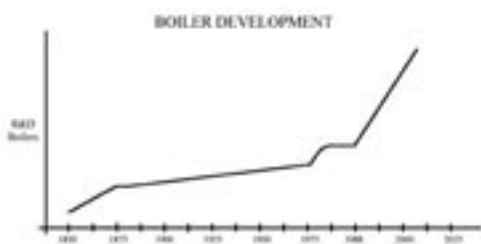
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Update on the Energy Scenario

Parker Boilers

Gregory E. Danenhauer, Vice President of Engineering



1999 NATIONAL BOARD INCIDENT REPORT Power Boilers

OBJECT EXPERIENCING INCIDENT	ACCIDENTS	INJURIES	DEATHS
Safety Valve	1	1	0
Low Water Condition	67	2	1
Limit Controls	27	0	0
Improper Installation	14	1	0
Improper Repair	24	0	0
Faulty Design or Fabrication	22	1	0
Operator Error or Poor Maintenance	143	0	0
Burner Failure	27	20	3
Unknown/Under Investigation	13	0	0
SUBTOTALS	339	21	1
TOTALS	3,160	126	21

- II. THE COMBUSTION PROCESS**
- A. Combustion
 - B. Factors & Key Words
 - C. Formation of NOx
 - D. Atmospheric combustion
 - E. Power Burners
 - F. NOx corrected to 3% O₂

THE KEY WORDS & RULES GOVERNING BOILER DECISIONS ARE:

1. BACT (Best Available Control Technology). For AQMD
2. LAER (Lowest Achievable Emission Rate).
3. Rule 219 (Permitting Rule, New & Existing Boilers).
4. Rule 1146 (Retrofit Rule) Boiler \leq 5 Million BTU/H.
5. 1146.1 (Retrofit Rules) Boilers $2 \leq$ 5 Million BTU/H.
6. 1146.2 (New & Retrofit) Boilers 75,000 - 2.0 Million BTU/H.
7. Rule 1121 (Proposed) Water Heaters. 0 - 75,000 BTU/H.
8. Source Test
9. Fees
10. Clean Fuels

COMBUSTION



AIR = 20.9% OXYGEN + 79.1% NITROGEN



PERFECT COMBUSTION= 10 CU. FT. AIR/ 1 CU. FT. GAS

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FACTORS & KEY WORDS THAT EFFECT COMBUSTION

- FLUE GAS
- DRAFT
- COMBUSTION EFFICIENCY
- COMBUSTION FLUE GAS ANALYSIS
- CARBON DIOXIDE / OXYGEN
- EFFECTS OF EXCESS AIR
- CARBON MONOXIDE (CO)
(LESS THAN 400 PPM @ 3% O₂)
- EFFECTS OF CO



NO_x EMISSIONS

1. NO_x is formed in all combustion processes known as "Thermal NO_x" and/or "Fuel NO_x".
2. Fuel NO_x is associated with fuels containing bound Nitrogen (Fuel, Oils, Coal).
3. NO_x consists of 80 to 95% NO the remainder in NO₂.
4. Formed more with increased exposure at high temperatures.

SMOG

1. NO_x reacts with sunlight to produce Ozone & Photochemical smog.

NO_x CORRECTED TO 3%

$$\frac{(20.9 - O_2)}{20.9 - 3} = CF \text{ (Correction Factor)}$$

at 7% O₂

$$\frac{20.9 - 3}{20.9 - 7} = \frac{17.9}{13.9} = 1.28 = CF$$

so if NO_x reading is 80 ppm
80 ppm @ 7% O₂ is
80 x 1.28 = 102 ppm NO_x @ 3% O₂



III. BOILER & BURNER NO_x CONTROL STRATEGIES FROM LARGE EQUIPMENT

COMBUSTION MODIFICATIONS

- A. Flue gas re-circulation.
- B. Staged combustion.
- C. Low NO_x Burners
- D. Reduced Air Preheat
- E. Ammonia or Urea injection
- F. Low excess air
- G. O₂ Trim

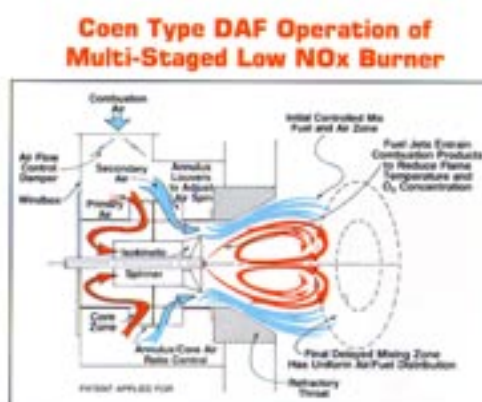
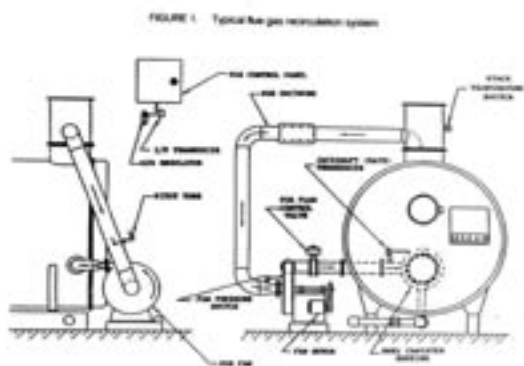
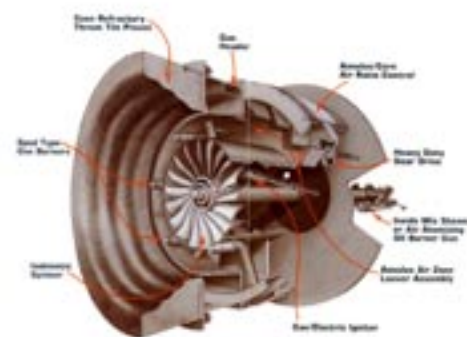
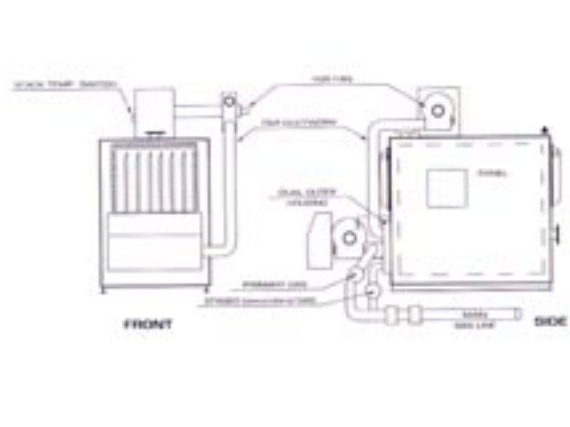
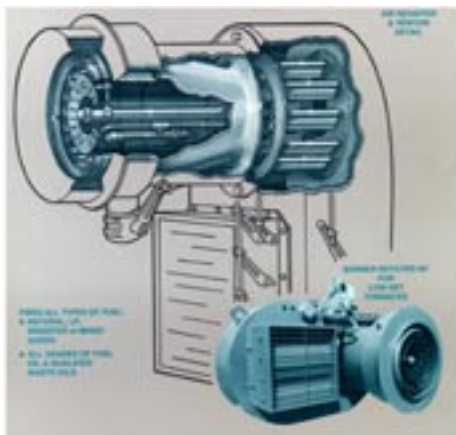
FLUE GAS TREATMENT

- H. Clean Fuel
- I. Selective Catalytic Reduction
- J. Non-selective Catalytic Reduction
- K. Electron Beam Radiation
- L. Chemical Scrubbing
- M. Urea Injection
- N. LTO (Low Temperature Oxidation)

Update on the Energy Scenario

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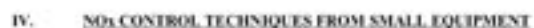
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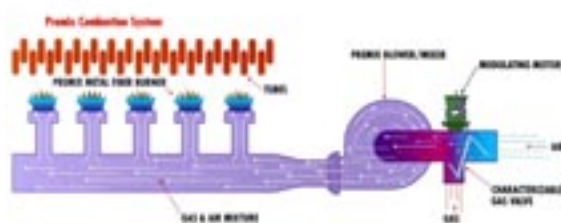


Parker Boilers

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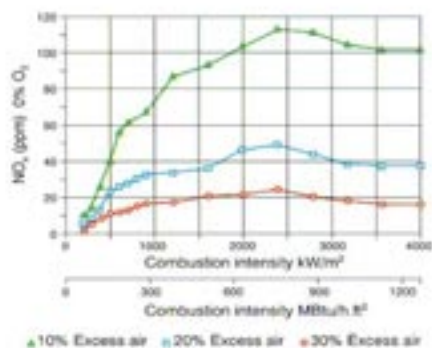
- A. Premix technology
- B. Radiant & Connective Premix Burners
- C. Pulse Technology
- D. Atmospheric Low NOx Burners



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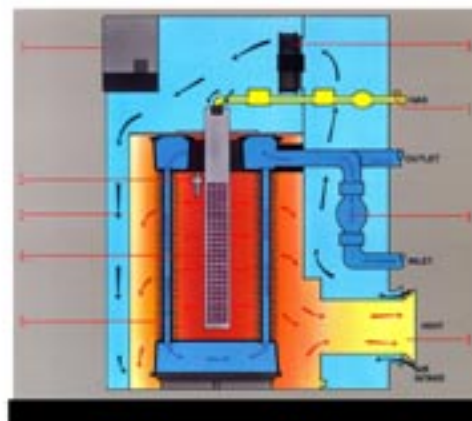
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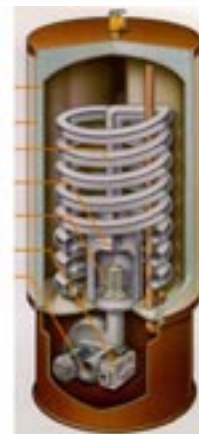


COMPARISON OF PARAMETERS: CONVENTIONAL vs. POWER PREMIX

Parameters	Power Premix	Conventional Atmospheric
O ₂ in Stack	4.5 - 6%	6 - 7.5%
Excess Air	24.5 - 36%	36 - 50%
NO _x @ 3% O ₂	25 PPM	110 PPM
CO @ 3% O ₂	50 PPM	200 PPM
Combustion Efficiency Gain	1 - 2.5%	Baseline
Thermal Efficiency Gain	1 - 3%	Baseline



WATER TUBE BOILER





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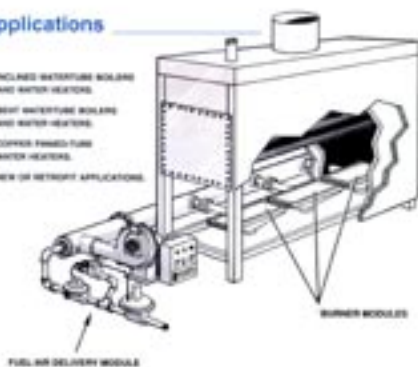
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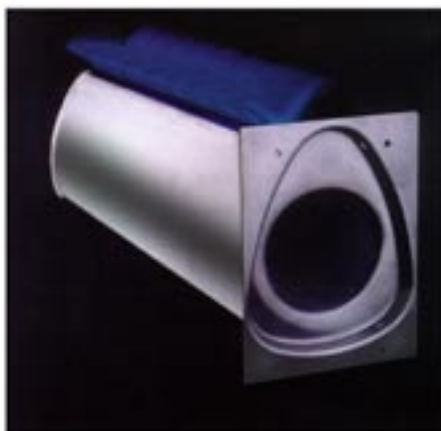
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Applications

- INCLINED WATERFIRE BOILERS AND WATER HEATERS
- HORIZONTAL WATERFIRE BOILERS AND WATER HEATERS
- COOPER-PANDED FLAME WATER HEATERS
- NEW OR RETROFIT APPLICATIONS



Immersion Tube Burner



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Update on the Energy Scenario

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